

## PATENT ABSTRACTS OF JAPAN

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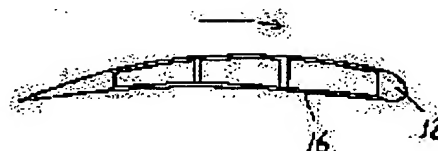
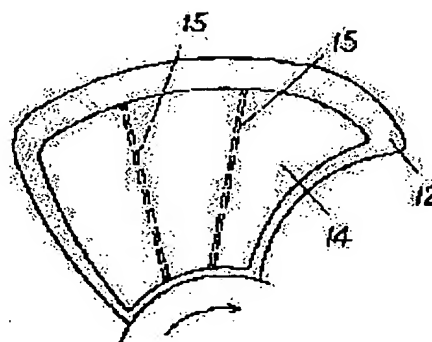
(72)Inventor : KUSUHARA HISAO

## (54) IMPELLER FOR AIR BLOWER

## (57)Abstract:

PURPOSE: To reduced the an weight of impeller while maintaining its performance in a wing type having thickness, and also provide the impeller which can be formed easily.

CONSTITUTION: A plurality of wing type blades 12 having thickness are provided on the circumference of a hub, and each of them is formed in a shape so that one side surface of each blade 12 is gouged, and linear ribs 15 are provided on each gouged part 14, and stuck in a lid shape by sheet shaped members 16.



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CLAIMS

[Claim(s)]

[Claim 1] Plurality is heavy-gage to the perimeter of a hub, it is equipped with the wing of a profile, the configuration where the one side side of said wing was scooped out is given, and it is the impeller for blowers which scooped out, prepared the linear rib in the section and was further pasted up in the shape of a lid by the sheet-like member.

[Claim 2] The configuration where the one side side of a wing was scooped out is given, and it is the impeller for blowers which scooped out, prepared the column-like rib in the section and was further pasted up in the shape of a lid by the sheet-like member.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the impeller for blowers of a profile with thickness with the low noise effectiveness.

[0002]

[Description of the Prior Art] As a conventional impeller for blowers, the thing of a configuration as shown in drawing 4 was general. That is, two or more wings 2 are formed every perimeter regular intervals of the cylindrical shape-like hub 1, the impeller 3 of such a configuration is dedicated to suitable casing, and an air blasting operation is produced by making it rotate in the direction of the arrow head shown in drawing 5. An impeller 3 fixes the boss section 4 of the center of said hub 1 to the shaft of a fan motor, and rotates. Drawing 5 shows the front view and sectional view from A of drawing 4 of this wing.

[0003] here, the wing 2 was constituted from a viewpoint on shaping and the engine performance by the thickness (about  $t=3\text{mm}$ ) of about 1 law. However, in this configuration, the noise level to need air capacity becomes high greatly [ the turbulence of air ]. There is an impeller with the

configuration of the profile which has thickness as shown in drawing 6 as a cure proposal to this. While lessening turbulence of air by making a wing 5 into a profile, a pressure effect is heightened and the noise level to need air capacity becomes low.

[0004] If a fan's thickness increases as shown in field sign 7  $R>7$  whose diameter of a fan is the axial blower of  $\phi 370$ , the noise level to need air capacity becomes low.

[0005] However, naturally increasing thickness puts on the weight and we are anxious about the shaft of a fan motor, or the life of a bearing. In order to mitigate the weight, various attempts are made, but if foaming is carried out, for example, HIKE arises, and if blow molding is carried out, balance will become easy to collapse with the location of a cellular part.

[0006] There is the shaping approach by ultrasonic bonding as shown in drawing 8 as second cure proposal for this. the configuration where this scooped out the suction-surface side of said wing — giving — the — it scooped out and the linear rib 8 was formed in the section 7, it scooped out and said periphery section of the section 7 and covering device 9 fabricated by said division material by said rib 8 have pasted up with the supersonic wave. According to this approach, HIKE in foaming and according to location of cellular part in blow molding again balance collapse are lost, and the engine performance of the profile which is moreover thick can be maintained.

[0007]

[Problem(s) to be Solved by the Invention] However, by this shaping approach, a certain amount of thickness is required for the covering device of said division material, and weight cannot be mitigated so much, either, but a facility of the metal mold of a covering device and a facility of ultrasonic bonding are also needed, and cost increases.

[0008] Then, this invention mitigates weight, with the engine performance of a thick profile maintained, and offers the impeller which is further easy to fabricate.

[0009]

[Means for Solving the Problem] In order to solve this technical problem, plurality of this invention is heavy-gage to the perimeter of a hub, it equips it with the wing of a profile, gives the configuration where the one side side of said wing was scooped out, and is that impeller for blowers that scooped out, prepared the linear rib in the section and was further pasted up in the shape of a lid by the sheet-like member.

[0010] Moreover, the configuration where the one side side of said wing was scooped out is given, and it is the impeller for blowers which scooped out, prepared the column-like rib in the section and was further pasted up in the shape of a lid by the sheet-like member.

[0011]

[Function] As mentioned above, plurality can be heavy-gage to the perimeter of a hub, it can be equip with the wing of a profile, the configuration where the one side side of said wing was scooped out can be give, weight can be mitigate, with the engine performance of the profile which is thick by [ the ] scoop out, prepare a linear rib in the section and paste up in the shape of a lid by the sheet-like member further maintain, and the impeller which is further easy to fabricate can be obtain.

[0012] Moreover, plurality can be heavy-gage to the perimeter of a hub, it can be equip with the wing of a profile, the configuration where the one side side of said wing be scooped out can be give, weight can be mitigate, with the engine performance of the profile which be thick by [ the ] scoop out, prepare a column-like rib in the section and paste up in the shape of a lid by the sheet-like member further maintain, and the impeller which be further easy to fabricate can be obtain.

[0013]

[Example] Hereafter, the example of this invention is explained based on drawing 1 -3.

[0014] In drawing 1, the impeller 10 is equipped with the wing 12 of the profile of two or more sheets every perimeter regular intervals of the cylindrical shape-like hub 11. And as shown in the suction-surface side of a wing 12 at drawing 2, the part 14 scooped out in the predetermined depth is provided. Drawing 2 shows the front view and sectional view from A of drawing 1 of this wing.

[0015] and — the — it scoops out, the linear rib 15 is formed in the section 14, and it has

pasted up in the shape of a lid by the sheet-like member 16 further.

[0016] The impeller 5 of such a configuration is dedicated to suitable casing, and an air blasting operation is produced by making it rotate in the direction of the arrow head shown in drawing 1 . An impeller 5 produces an air blasting operation by fixing the boss section 8 of the center of said hub 6 to the shaft of a fan motor, and rotating.

[0017] Moreover, the 2nd example is shown in drawing 3 . the configuration where this scooped out the suction-surface side of said wing 12 -- giving -- the -- it scoops out, the column-like rib 17 is formed in the section 14, and it has pasted up in the shape of a lid by the sheet-like member 16 further.

[0018] Like, by [ these ] pasting up a thin sheet-like member in the shape of a lid, weight can be mitigated with the engine performance of a thick profile maintained, and the impeller which is further easy to fabricate can be obtained.

[0019]

[Effect of the Invention] The impeller which gives the configuration where the one side side of a wing was scooped out, plurality is heavy-gage to the perimeter of a hub, equips it with the wing of a profile, mitigates weight, with the engine performance of the profile which is thick by [ the ] scooping out, preparing a linear rib in the section and pasting up in the shape of a lid by the sheet-like member further maintained, and is further easy to fabricate according to this invention as mentioned above can be obtained.

[0020] Moreover, plurality can be heavy-gage to the perimeter of a hub, it can be equip with the wing of a profile, the configuration where the one side side of a wing was scooped out can be give, weight can be mitigate, with the engine performance of the profile which is thick by [ the ] scoop out, prepare a column-like rib in the section and paste up in the shape of a lid by the sheet-like member further maintain, and the impeller which is further easy to fabricate can be obtain.

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the impeller in the example of this invention

[Drawing 2] (a) is the partial front view of this impeller.

(b) is this sectional view.

[Drawing 3] (a) is the partial front view of the impeller in the 2nd example of this invention.

(b) is this sectional view.

[Drawing 4] The perspective view of the impeller in the conventional example

[Drawing 5] (a) is the partial front view of this impeller.

(b) is this sectional view.

[Drawing 6] (a) is the partial front view of the impeller of other conventional examples.

(b) is this sectional view.

[Drawing 7] Noise property drawing showing the effectiveness of this impeller

[Drawing 8] (a) is the partial front view of the impeller of other conventional examples.  
(b) is this sectional view.

[Description of Notations]

- 1 Hub
- 2 Wing
- 3 Impeller
- 4 Boss Section
- 5 Wing
- 6 Wing
- 7 Scoop Out and it is Section.
- 8 Rib
- 9 Covering Device
- 10 Impeller
- 11 Hub
- 12 Wing
- 13 Boss
- 14 Scoop Out and it is Section.
- 15 Rib
- 16 Sheet-like Member
- 17 Rib

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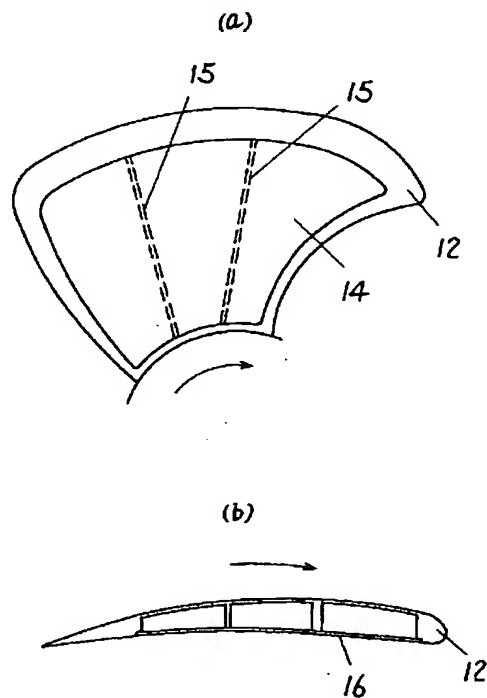
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(54)【発明の名称】 送風機用羽根車

(57)【要約】

【目的】 厚みのある翼型の性能を保ったままで重量を軽減し、さらに成形しやすい羽根車を提供するものである。

【構成】 ハブの周囲に複数個の厚肉で翼型の羽根12を備え、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部14に線状のリブ15を設け、さらにシート状部材16で蓋状に接着する。



## 【特許請求の範囲】

【請求項1】ハブの周囲に複数個の厚肉で翼型の羽根を備え、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に線状のリブを設け、さらにシート状部材で蓋状に接着した送風機用羽根車。

【請求項2】羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に柱状のリブを設け、さらにシート状部材で蓋状に接着した送風機用羽根車。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は低騒音効果を持つ厚さのある翼型の送風機用羽根車に関するものである。

【0002】

【従来の技術】従来の送風機用羽根車としては、図4に示されるような構成のものが一般であった。即ち、円柱形状のハブ1の周囲等間隔おきに複数枚の羽根2を設け、このような構成の羽根車3を適当なケーシングに納め、図5に示す矢印の方向に回転させることで送風作用を生じる。羽根車3は前記ハブ1の中央のボス部4をファンモータのシャフトに固定して回転するものである。図5はこの羽根の図4のA方向からの正面図と断面図を示している。

【0003】ここで、羽根2は成形上および性能上の観点から、ほぼ一定の厚さ( $t=3\text{ mm}$ 程度)で構成されていた。しかし、この形状では空気の乱れは大きく必要風量に対しての騒音レベルは高くなる。これに対しての対策案として、図6に示したような厚みのある翼型の形状を持った羽根車がある。羽根5を翼型にすることで空気の乱れを少なくするとともに、圧力効果を高め必要風量に対しての騒音レベルは低くなる。

【0004】ファン径がφ370の軸流送風機の場合図7に示したようにファンの厚さが増せば必要風量に対しての騒音レベルは低くなっていく。

【0005】しかし、厚さを増すことは、当然その重量が増えファンモータのシャフトやベアリングの寿命が懸念される。その重量を軽減するため様々な試みがなされているが、例えば発泡成形すればヒケが生じ、また中空成形すれば気泡部分の位置によりバランスが崩れ易くなる。

【0006】これに対する、第二の対策案として図8に示したような超音波接着による成形方法がある。これは、前記羽根の負圧面側をえぐり取った形状を持たせ、そのえぐり部7内に線状のリブ8を設け前記えぐり部7の外周部と前記リブ8に同部材で成形された蓋部9が超音波により接着されている。この方法によれば、発泡成形でのヒケや、また中空成形での気泡部分の位置によるバランス崩れがなくなり、しかも厚みのある翼型の性能を保つことができる。

【0007】

【発明が解決しようとする課題】しかし、この成形方法

では同部材の蓋部には、ある程度の肉厚が必要であり重量もそれほど軽減できず、蓋部の金型の設備や超音波接着の設備も必要となり、コストが増大する。

【0008】そこで、本発明は厚みのある翼型の性能を保ったままで重量を軽減し、さらに成形しやすい羽根車を提供するものである。

【0009】

【課題を解決するための手段】この課題を解決するために本発明は、ハブの周囲に複数個の厚肉で翼型の羽根を備え、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に線状のリブを設け、さらにシート状部材で蓋状に接着した送風機用羽根車である。

【0010】また、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に柱状のリブを設け、さらにシート状部材で蓋状に接着した送風機用羽根車である。

【0011】

【作用】上記のように、ハブの周囲に複数個の厚肉で翼型の羽根を備え、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に線状のリブを設け、さらにシート状部材で蓋状に接着することにより、厚みのある翼型の性能を保ったままで重量を軽減し、さらに成形しやすい羽根車を得ることができる。

【0012】また、ハブの周囲に複数個の厚肉で翼型の羽根を備え、前記羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に柱状のリブを設け、さらにシート状部材で蓋状に接着することにより、厚みのある翼型の性能を保ったままで重量を軽減し、さらに成形しやすい羽根車を得ることができる。

【0013】

【実施例】以下、本発明の実施例について、図1～3に基づいて説明する。

【0014】図1において羽根車10は円柱形状のハブ11の周囲等間隔おきに複数枚の翼型の羽根12を備えている。そして、羽根12の負圧面側に図2に示すように、所定の深さでえぐり取った部分14を設けている。図2はこの羽根の図1のA方向からの正面図と断面図を示している。

【0015】そして、そのえぐり部14に線状のリブ15を設け、さらにシート状部材16で蓋状に接着してある。

【0016】このような構成の羽根車5を適当なケーシングに納め、図1に示す矢印の方向に回転させることで送風作用を生じる。羽根車5は前記ハブ6の中央のボス部8をファンモータのシャフトに固定して回転することにより送風作用を生じる。

【0017】また、第2の実施例を図3に示す。これは、前記羽根12の負圧面側をえぐり取った形状を持たせ、そのえぐり部14に柱状のリブ17を設け、さらにシート状部材16で蓋状に接着してある。

【0018】これらのように、薄いシート状部材を蓋状

に接着することにより、厚みのある翼型の性能を保ったまま重量を軽減し、さらに成形しやすい羽根車を得ることができる。

【0019】

【発明の効果】以上のように本発明によれば、ハブの周囲に複数の厚肉で翼型の羽根を備え、羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に線状のリブを設け、さらにシート状部材で蓋状に接着することにより、厚みのある翼型の性能を保ったまま重量を軽減し、さらに成形しやすい羽根車を得ることができる。

【0020】また、ハブの周囲に複数の厚肉で翼型の羽根を備え、羽根の片面側をえぐり取った形状を持たせ、そのえぐり部に柱状のリブを設け、さらにシート状部材で蓋状に接着することにより、厚みのある翼型の性能を保ったまま重量を軽減し、さらに成形しやすい羽根車を得ることができる。

【図面の簡単な説明】

【図1】本発明の実施例における羽根車の斜視図

【図2】(a)は同羽根車の部分正面図

(b)は同断面図

【図3】(a)は本発明の第2の実施例における羽根車の部分正面図

(b)は同断面図

【図4】従来例における羽根車の斜視図

【図5】(a)は同羽根車の部分正面図

\* (b)は同断面図

【図6】(a)は他の従来例の羽根車の部分正面図

(b)は同断面図

【図7】同羽根車の効果を示す騒音特性図

【図8】(a)は他の従来例の羽根車の部分正面図

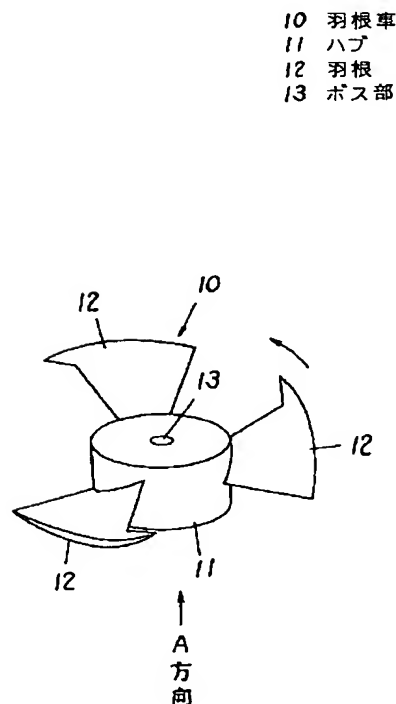
(b)は同断面図

【符号の説明】

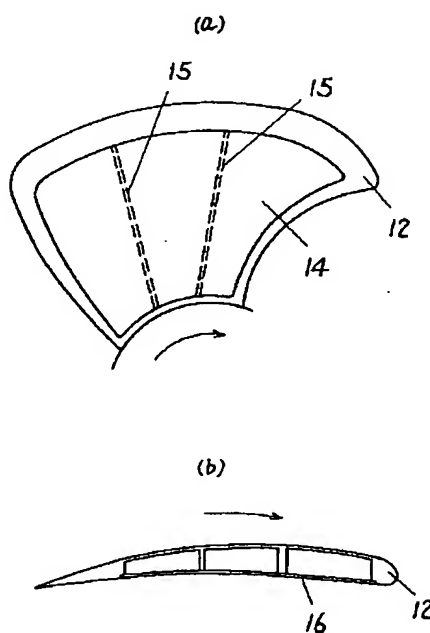
- 1 ハブ
- 2 羽根
- 3 羽根車
- 4 ボス部
- 5 羽根
- 6 羽根
- 7 えぐり部
- 8 リブ
- 9 蓋部
- 10 羽根車
- 11 ハブ
- 12 羽根
- 13 ボス
- 14 えぐり部
- 15 リブ
- 16 シート状部材
- 17 リブ

\*

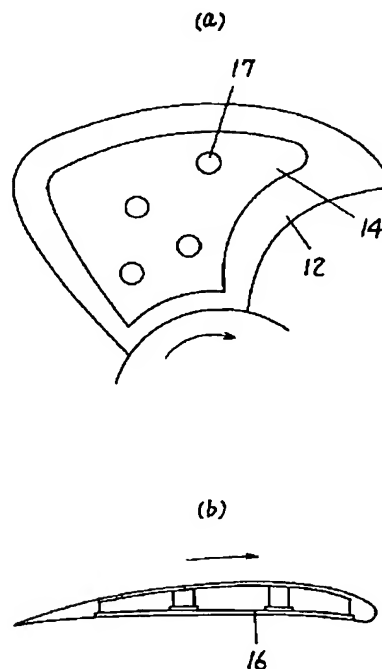
【図1】



【図2】

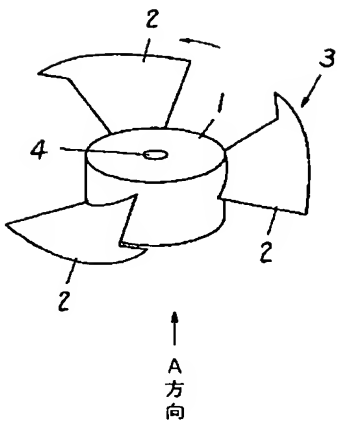


【図3】



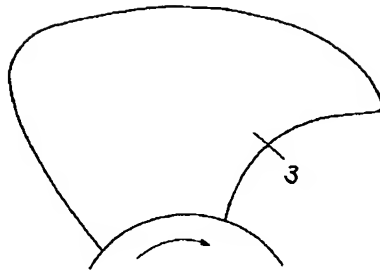


【図4】



【図5】

(a)

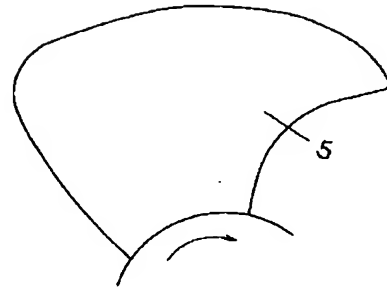


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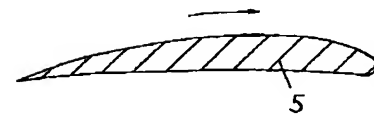


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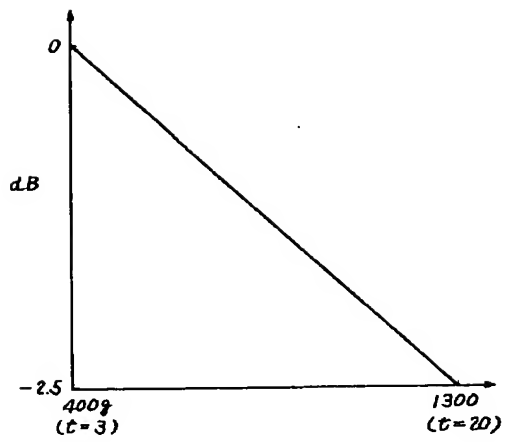
(a)



(b)

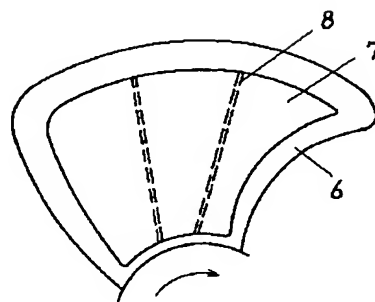


【図7】



【図8】

(a)



(b)

